

The Mining Journal

London, August 9, 1957

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Vol. 249

No. 6364

Established 1835

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Circulation

Robert Budd

Published each Friday by

THE MINING JOURNAL LTD.

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15, WILSON STREET,

LONDON, E.C.2.

Telegraphic

Tutwork London

Telephone

MONarch 2567 (3 lines)

Annual Subscription £2 10s. Single copy ninepence

Whither Platinum ?

WHEN eminent specialists disagree, the patient may be in a position to call for a third opinion; otherwise, he and his medical advisers can only decide for themselves which opinion seems most correct in the light of available evidence.

This seems to be much the kind of situation which has arisen in regard to platinum. Nobody is better placed to make an authoritative assessment of the future outlook for this metal than the two leading refiners, Baker Platinum and Johnson, Matthey and Co., which between them handle all but a small proportion of the Free World sales. Yet these two companies, which have held their official quotations at the same level for a number of years, have come, pricewise, to a parting of the ways, at any rate for the time being. Moreover, statements made during the past week point to a considerable divergence of opinion between the two companies regarding platinum's short-term prospects.

On the principle that actions speak louder than words, the most eloquent commentary on the two different assessments of the short-term outlook is that Baker Platinum has cut its quotation in the U.K. from £34 to £31 an oz., whereas Johnson, Matthey has left its quotation unchanged and is understood to have no intention at the present time of making any cut.

Mr. C. W. Engelhard, chairman of Engelhard Industries, the parent company of the Baker group, ascribes the weakness of the platinum market to a reduction in demand from the oil industry, which has come about because the major oil companies have already obtained the supplies they needed, and because of a tendency to reduce the percentage of platinum used in the oil industry. Further depressants mentioned by Mr. Engelhard are cheaper offers of Soviet platinum and the fact that platinum has been used as a means of taking advantage of the low price of Kuwait residential sterling by switch transactions. The lower priced Russian platinum available in the U.S. and the Continent has hitherto been kept out of the U.K., by restrictions which prevented its importation through currency control, but this situation no longer exists, platinum having been placed on world open general licence from August 1.

These bearish factors have not been overlooked by metal dealers, as recent behaviour of the London and New York metal markets has clearly shown. But it seems very possible that their significance is being over-stressed.

To many people it must have come as a considerable surprise to be informed that the overall demand from the oil industry should be declining at the present time. The decision last year to embark upon still further expansion at Rustenburg Platinum Mines was based largely on forward demand from the oil industry. Although there is now a tendency to reduce the percentage of platinum used in this industry, this loss should surely be far more than offset during the years immediately ahead by the high level of new refinery construction bearing in mind that demand for oil in the Free World outside the U.S. is expected to advance by about 7.7 per cent per annum between now and 1966. Hence the greater part of the new refinery construction in future years will take place outside the U.S.; a consideration which is perhaps not without relevance in the present context.

It certainly seems unlikely that any new factors of importance affecting platinum consumption in the oil industry can have arisen in recent months which were not foreseen by the directors of Rustenburg last year, when it was decided that a further increase in output was necessary to cater for future demand. Mine production cannot, of course, be expanded uniformly with demand, so that periods of temporary excess supply are more or less inevitable from time to time in any industry which strives to anticipate future needs. Even so, the prospect of a surplus during the period immediately ahead hardly seems to accord with the policy and views of the South African producers, as indicated by quite recently published statements.

So far as Russian offerings are concerned, our own feeling is that it would be unwise to attach too much significance to this potential threat to the stability of platinum, bearing in mind that programmes of oil and industrial expansion within the Communist countries ensure a rapidly expanding market, which may be expected to absorb increasing quantities of Soviet platinum in future years.

Mr. Engelhard has been quoted as saying that, unless and until a new use for platinum was found to at least replace declining amounts of the metal consumed by the oil industry, there would tend to be an over-supply, taking into account the substantially increased production available, and that he knew of no new use large enough to help the market. In nuclear power generation, however, platinum appears to have found another outlet which should be capable of considerable expansion in future years. Interesting possibilities are also presented by a recent statement that a platinum catalyst might be used to produce hydrogen peroxide missile fuel.

Analysis of such information as is generally available suggests that the immediate outlook for platinum, while not entirely reassuring in some respects, is certainly less critical than might appear from Mr. Engelhard's remarks.

Holders of South African platinum shares have no real cause for worry so long as Johnson, Matthey and Co. are able to hold their quotation at a figure approaching their present price of £34 an oz., and there is nothing so far to suggest that the company has any misgivings on this score. It has also to be remembered that the two major refiners, acting in concert, were able to hold the prices of the platinum group metals steady during the years of scarcity, when these metals were commanding enormous premiums in the free market. Together, they are unquestionably strong enough, if need arose, to prevent the stability of the market from being undermined by excessive offerings should any temporary surplus of these metals result from expansion projects based on long-term projections of future needs.

TIN'S COMFORTABLE FUTURE

The latest meeting of the International Tin Council has undoubtedly created a bullish impression at a time when, in view of the continuing weakness of copper, lead and zinc, and because of dangers peculiar to tin, the market was in need of some substantial reassurance.

In the first place, the Council acknowledged that there was no tin in the Buffer Stock on March 31; there was nothing surprising in this, but it is useful to have the confirmation. It gives a psychologically comforting reassurance that there is plenty of cash yet to be spent. The second and third instalments of subscriptions to the Buffer Stock have not yet even been called for.

More important, the Council has been able to say that

Canada will not sell metal from her stockpile at less than £830 per ton (the price at which the Buffer Stock manager can himself sell), and secondly, that she will not release it—even at that price—at a rate faster than Canadian consumers can absorb it. In other words, the metal is not to be hawked the world over. The reassurances of the United Kingdom are less clear but they convey the intention of not wishing to depress the market by the sales of stockpile metal. There is more in these reassurances than a mere readiness to abstain from dumping metal. The Canadians definitely want to rid themselves of their stocks; so that when they say that they do not at present intend to sell at less than £830, they are not merely safeguarding the present price, they are also implicitly expressing conviction that it will not be long before they will be able to sell at £830.

A confirmation of this bullish sentiment has come in the annual report of Mr. Clifford Waite to the stockholders of Consolidated Tin Smelters (see page 176). He foresees the actual surplus in 1957 as rather less than the theoretical surplus of 10,000 in 1956; more specifically he puts it at between 5,000 and 10,000 tons. On the one hand he believes that production in some countries will be lower and on the other he does not expect the rise in the trend of tin consumption to slacken off.

His view in the longer term is even more encouraging. As he points out, tinplate now takes 40 per cent of the world's tin production and the quantity of tin used in tinplate has increased by 11,000 tons over the last three years. More important, he believes that the cut in tin consumption consequent on switching from hot dip to electrolytic tinning or to a complete change-over to lacquered steel will be more than counterbalanced by bigger outputs of tinplate. In this respect it is important to bear in mind that the switchover to electrolytic tinning has virtually run its course in the United States, where the bulk of the world's tinplate production is concentrated. Furthermore, the International Tin Agreement shows every sign of providing that market stability which the Americans have long complained was missing.

On the matter of the International Agreement, Mr. Waite is well satisfied. Indeed, he thinks it has already proved its worth. "I venture to suggest that but for the existence of the International Tin Agreement, the price fall for tin would have been much more marked, notwithstanding the narrowness of the margin between supply and demand". Yet Consolidated Tin Smelters has had to make substantial loans to the Bolivian Mining Corporation to finance Bolivia's contribution to the Buffer Stock. In this respect the Bolivian industry was similarly placed to the Malayan; but whereas the Malayan industry could turn to its own government for finance, there was never any chance that the Bolivian Government could find the ready cash. The accommodation should emphasize again the value to the Bolivian mining industry of its connection with the tin smelting facilities in the United Kingdom.

Naturally, Mr. Waite looks forward to the attainment of full self-government and independence within the Commonwealth for Malaya during September. After discussions with Ministers and others in Malaya, in an attempt to make an appreciation of the future investment climate, he states that he is "pleased to be able to state that the views expressed to them confirm my faith and confidence in the future prosperity of Malaya." He was confident that the Malayan Ministers were fully alive to the need for rationalizing the policy governing the alienation of state plans for mining.

It is impossible to disagree with Mr. Waite, for there has been much evidence of the determination of the present Ministers to make their country prosperous. Yet it would be wrong to ignore two clouds that lie on the horizon. The

first is that the political alliance of Tengku Abdul Rahman is one of races and parties that in the past have managed to combine on very little apart from their insistence on self-government and independence. The alliance has successfully negotiated independence, and has accepted one of the most complicated constitutions ever devised in the hope that it will produce effective government and racial harmony. But the real test of the alliance has yet to come. Always in the background is the problem of Singapore, with its overwhelming Chinese population.

The second cloud is that whereas it is possible to place every confidence in the government of Tengku Abdul Rahman, there is the example of Ceylon to consider. When Ceylon became independent and for some years after, she was ruled by a governing oligarchy that was all that the West could have hoped for. Overnight the government was swept away, and in its place a new one appeared, pledged externally to the Oriental policy of positive neutrality and internally to a policy of nationalizing production, and particularly foreign-owned facilities. Will the same thing happen in Malaya?

At the present there is one major market uncertainty for tin—the policy of Russia. Over the past months Russia has been a consistent seller of tin and there is no way of determining whether she will continue this policy. The chances must be that supplies of Russian tin will drop out in the course of the next five years as Russian tinplate output increases. Mr. Krushchev has publicly stated his determination to bring the Russian standard of life up to par with the Americans. This does not mean that the American manner of living will be copied, but it will be quite impossible substantially to raise Russian living standards without getting somewhere near the American *per capita* consumption of tinplate. It could be argued that Mr. Krushchev's intention is no more than a boast, but Mr. Krushchev has staked his reputation and authority on his policy, and he is by no means certain to hold his position if this proves to be a failure. He has, therefore, the best of all possible motives for getting on with the job. There may be some uncertainties, therefore, over the next few years, but five, and certainly ten, years' hence should see a sustained demand for tinplate at very substantially higher levels than the present ones.

BEACH SANDS IN WESTERN AUSTRALIA

Two companies are now actively producing ilmenite in the Bunbury district of Western Australia. A third company, Westralian Oil, will be in the field next year. This company, by drilling and shafting, on an area at Yoganup, has reported the proving of 1,300,000 tons of concentrate, the mineral content of which is 77 per cent ilmenite, 14 per cent zircon and 6 per cent of other commercial minerals. The ilmenite is stated to be of high grade containing 60 per cent titanium dioxide compared with 54 per cent, in the Capel area, in which the company also holds leases said to contain 900,000 tons of concentrates of 54 per cent ilmenite. Plant is to be erected with an annual capacity of 100,000 tons of concentrate.

Western Titanium, also at Capel, claims to have disclosed by prospecting, 3,250,000 tons of heavy minerals in the higher grade section of its area, and 3,537,000 tons in the lower grade section. Over the whole deposit, the ilmenite content of the heavy mineral is 82.8 per cent with zircon, monazite and rutile amounting to about 12 per cent.

The third Western Australian company located at Bunbury, is Cable 1956 Ltd. which has a plant in operation at

the rate of over 40,000 tons of ilmenite per year; ore reserves are not yet definitely known as boring is still in progress, but are definitely large and of high grade.

With the rapid increase in the production of ilmenite in Australia the problem is: will the development in the use and demand for titanium keep pace with output, or will production overtake the users' needs and a heavy fall in price result from over-production and accumulated stocks of mineral?

E.C.S.C.'S FIRST FIVE YEARS

The outstanding success of the European Coal and Steel Community's first five years of operation is the rise in the annual production of steel—a rise of 36 per cent between 1952 and 1956. Admittedly Europe as a whole has enjoyed a period of active industrial stimulation but the fact remains that the expansion in steel production has been very greatly assisted by a more regular flow of coal supplies and by more active and stable trade in iron ore between member countries. In 1956 the output of steel at 56,800,000 tonnes represented 20.1 per cent of world production and the Community as a steel producer ranks second only to the U.S.A.

Hard coal production, too, has increased although less appreciably. In 1952 total production of the six countries was 238,900,000 tonnes—10,200,000 tonnes less than in 1956. It is estimated that by 1975 total production of coal will be raised to 362,000,000 tonnes if demand is to be met.

Achievements within the E.C.S.C. have shown forcibly that common markets are not only practicable but highly successful. It was to be expected that the success of the common market for coal and steel would lead to a widening of horizons. Accordingly, draft Treaties were signed in Rome on March 25 of this year to bring into being on January 1, 1958, a general common market for all goods produced within the six countries (the European Economic Community) and also a plan for a European Atomic Community (Euratom) to speed the formation and development of nuclear industries. Ratification by the six governments is a virtual certainty. Thus, the common market for coal and steel has, in effect, been a pilot scheme for a more comprehensive economic integration. The working of these two new organizations will be modelled on the E.C.S.C. with institutional arrangements following broadly the same pattern.

One of the burning questions of the moment is whether or not the U.K. will eventually join the General Common Market. Many of the member countries would welcome the U.K. particularly in view of the fact that there is a fear of possible German domination. This has not been manifest in operations of the E.C.S.C. but the resurgence of Germany's industrial might gives rise to slight feelings of alarm.

Britain elected to remain outside the E.C.S.C. although signing a Treaty of Association, and so far shows no sign of wanting to join the General Common Market. With Imperial Preference it is, of course, difficult for Britain to accept supra-national authority although the U.K. is taking the lead in negotiations to create a Free Trade Area embracing the O.E.E.C. countries. Indeed, without British participation in a Free Trade Area with a General Common Market the U.K. will find new trade barriers raised against her in a market of 160,000,000 consumers which in 1955 took nearly 13 per cent of Britain's domestic exports.

The operation of the E.C.S.C. is described in an article on page 160.

Towards European Integration

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IT was on May 9, 1950, that the French Government, profoundly concerned over developments in the international situation and the weakening of Europe's position in the world economy, proposed "the placing of Franco-German production of coal and steel under common higher authority, within the framework of an organization open to the participation of other countries of Europe".

The architects of this scheme were two Frenchmen, M. Jean Monnet and M. Robert Schuman, and although they had as the prime object joint control of Franco-German coal and steel as a means of bringing about the end of the traditional enmity between the two countries by pooling and channeling into peaceful uses the essential ingredients of any war, the plan they proposed had wider application.

By A. GRIERSON

The announcement of the French scheme brought an immediate response and in the following month joint communiques were issued by France, Germany, Belgium, Italy, Luxembourg and the Netherlands associating themselves with the scheme and declaring the intention to pool coal and steel production and to create a supra-national authority whose decisions would be binding upon the six countries concerned and any other countries joining subsequently. Eventually on April 18, 1951, the draft Treaty establishing the European Coal and Steel Community was signed and after final ratification by the six governments the 50-year Treaty came into force on July 25, 1952. The first European Federal Government had come into being.

The Institutions

To understand the workings of the European Coal and Steel Community it is necessary to examine the structure of the supra-national controlling organization. The E.C.S.C. has four so-called institutions:—

The High Authority: A nine-man executive assisted by a 51-man Consultative Committee composed of producers, workers and consumers in equal numbers. The executive are appointed by the six member-governments and the first

Exactly five years ago a unique experiment was launched in Europe, so far-reaching in its implications that many declared it to be a brave but blind shot in the dark with slender chances of success. To-day, however, the results of this experiment have paved the way towards the ultimate creation of an integrated Europe.

H.A. consisted of two French, Belgian and German representatives and one from each of the remaining three countries. The High Authority must:

- (a) establish and maintain the common market by levelling frontier barriers and doing away with all trade restrictions for coal and steel among the member nations;
- (b) develop the common market, in particular by facilitating the financing of investments and by stimulating research;
- (c) guarantee the smooth progress of the common market, and of technical advance, notably by helping workers threatened with unemployment as a result of the reorganization and modernization of enterprises competing on the common market—this is done by partially financing technical retraining; or by helping workers, through reinstallation allowances, etc., to move to areas where jobs are available and by payment of "tiding-over" allowances; or by the setting up of alternative industries on the spot where no other remedy is feasible;
- (d) finance its activities by imposing a levy of not more than 1 per cent on the value of the Community's coal and steel production; this levy is at present 0.35 per cent;
- (e) enforce Europe's first major anti-cartel law, backed by the power to impose on violators fines of up to 10 per cent of their annual turnover.

The Common Assembly: A 78-member parliament, whose members are at present elected by and from the legislatures of the member countries. The High Authority must report annually to the Assembly, which can oust it on a vote of censure, voted by a two-thirds majority.

The Court of Justice: A tribunal of seven judges having sole power to decide whether decisions of the High Authority should be upheld or quashed. No national court has jurisdiction in these matters. The Court's judgments



Arbed Works, Belval,
Luxembourg

are directly binding on all parties, whether individuals, enterprises, national governments or the High Authority itself.

The Council of Ministers: Representing the governments of the six member states; meets to harmonize overall national policies with that of the Community. The High Authority consults the Council before taking most decisions, and the Council gives its opinion, which is usually not binding. In some cases (e.g. investments outside the field of coal and steel), the High Authority may not act without the Council's majority agreement.

At first sight these various institutions may appear rather complicated but in fact they are no more unwieldy—or unnecessary—than similar functional organizations which exist in any democratic community. During the first five years the controlling system has functioned remarkably smoothly, chiefly due to the fact that members of the four institutions appear to have replaced nationalism by supranationalism; loyalties being first and foremost to the Community. With the usual form of international organization it is generally the duty of each national representative to argue his country's case before the international body. Within the Community the procedure appears to be reversed. Other differences from an international organization are as follows:

- (a) The High Authority can act without obtaining the prior approval of the governments of the member states;
- (b) The High Authority's decisions are binding on the coal and steel enterprises of the Community without having to be embodied in national legislation or decrees;
- (c) The High Authority has power to enforce its decisions directly against enterprises;
- (d) The High Authority can fine firms violating Community rules;
- (e) The High Authority's inspectors have the same powers of looking into company books as national tax inspectors;
- (f) The High Authority can compel the national governments to enforce its decisions;
- (g) The High Authority can sue and be sued;
- (h) The High Authority has the power to levy and collect its own tax on coal and steel production;
- (i) The High Authority is responsible for its policy not to the national states but to the Common Assembly;
- (j) The judgments of the Court of Justice alone are binding on all parties within the Community, including the High Authority. They are final;
- (k) The High Authority, the Court, the Assembly, and their staffs are expressly prohibited from receiving any instructions or guidance from national governments.

The High Authority receives its money from two main sources. Firstly by a levy on all coal and steel production within the Community and secondly by negotiating loans either privately or from the U.S. Government. The levy on production—limited to a maximum of 1 per cent—is varied according to requirements and between January 1, 1953, and December 31, 1956, yielded \$173,700,000. Loans sought by the Authority are rapidly over-subscribed—indicative of the high esteem in which it stands.

It must be emphasized that the High Authority does not interfere in the technical running of the coal and steel industries. This is left to the firms concerned and private enterprise and competition are actively encouraged provided that the common rules are not infringed. Advice—technical or otherwise—is freely given by the High Authority's staff of 600—not large considering that fully half of these are purely administrative. Loans are made to those firms satisfying the High Authority that plans for development are in the interests of the Community and financial assistance has contributed to the implementation of investments in the Community's industries totalling more than \$500,000,000. Loans by the H.A. seldom exceed 30 per cent of the capital required and terms are more favourable to industry than by borrowing from other sources.

Achievements


Since setting up the Common Market for Coal and Steel the High Authority have successively eliminated customs duties, import and export quotas, currency restrictions, transport rate discriminations together with frontier freight penalties, and also dual pricing systems whereby prices charged on exported coal and steel differed from those charged to home consumers. Workers' wages have so far not been interfered with as these have kept pace with the rising cost of living, but provision has been made in the Treaty to prevent employers from cutting wages to undersell their competitors.

The various unions within the Community appear to be working harmoniously together and relations between the Authority and the workers are good. This is only to be expected bearing in mind the immense re-housing and rehabilitation schemes being carried through by the Authority. There are approximately 1,630,000 workers under the indirect control of the High Authority and its first building scheme, providing for a total of 15,000 housing units, is nearing completion and a second, for approximately 20,000 further units, has been launched. The Community will need many more workers in the steel and coal industries if future production targets are to be hit and the provision of more and more workers' houses is the surest way to achieve this object.

The E.C.S.C.'s Court of Justice



Stripping Overburden by Hydraulic Dredges



The discharge from one of the pipelines being measured to allow the amount of dredged material to be estimated

It is not often that the overburden above a mineral deposit is stripped by means of hydraulic dredges but this operation is now taking place at Steep Rock Lake, Ontario. As many of the economic deposits of the world's minerals are worked out by the heavy demands made by industry to-day, greater attention is being turned to the many rich mineral deposits to be found in the undeveloped regions of the world. Such an area is Northern Ontario, where beneath many of the region's lakes are heavy iron ore deposits. The most well-known deposit in that area is Steep Rock Lake, near Atikokan, Ontario, approximately 140 miles west of Port Arthur.

The discovery was first made in 1938 and because of the heavy war-time call for iron ore, development commenced in 1943.

In plan the lake has the shape of a letter M and mining operations are now spread out over the whole lake. Latest exploitation is being carried out by the Caland Ore Co. Ltd. and this company intends to spend some \$50,000,000 before the first shipment of iron ore is made in 1960. Eventually, it is anticipated that 3,000,000 tons of iron ore per year will be won from this development. Caland is a subsidiary of Inland Steel Co.

To obtain the iron ore from the bottom of the lake—and at considerable depth—roads, dams and tunnels, as well as living accommodation and other buildings, have been constructed. The most interesting operation is, however, the removal of the silt deposits on the floor of the lake and the dewatering necessary before mining can commence.

Before mining began at Steep Rock the water level in the lake was 1,263 ft. above sea level. Mining operations

have in the past reduced the level to 1,120 ft. and since Caland started work in 1955 the water level has dropped to 278 ft. above sea level.

Conventionally, the best method of removing the material was by pumping until this section of the lake was dry and then by shovel excavation. The depth of material to be moved varies between 50 and 400 ft. and the cost by this method would have been tremendous.

The method now being used employs two extremely large dredges and by their use the lake bed deposits are being carried away in suspension. Dredged material is being pumped out of Falls Bay, the area of the lake where work is centred and, together with lake water, travels 4½ miles through two 42-in. steel pipes to Marmion Lake. Here silt and other deposits settle out, the water finding its way back into Falls Bay to continue the pumping and dredging cycle. Calculations show that it will be necessary to completely pump out the water nine times before the dredging is completed. The water was lowered to average a depth of 75 ft. before dredging commenced. Pipeline material runs approximately 18 per cent silt and 82 per cent water.

Some idea of the magnitude of the work involved can be obtained when it is realized that more material will be removed by dredging than was removed in the construction of the Panama Canal. Estimates place the total amount of material to be removed at 180,000,000 cu. yds.

Key items of equipment in this work are the two hydraulic dredges, reputed to be the largest hydraulic dredges in the world. The hulls of these vessels measure 175 ft. long and 50 ft. wide and they are equipped with pumps operated by electrically-driven direct-drive 10,000 h.p. motors. Four similar motors are sited on the banks of the

One of the dredges working in a corner of the lake. The amount of water removed can be seen by the denuded banks



lake to lift the silt 800 ft. and carry it overland to Marmion Bay. The pumps can take boulders up to 21 in. in dia., whilst those above this size are trapped at the pump inlet.

The dredges have a 10-ft. revolving cutting head and they pump 112,000,000 gal. of water every 24 hrs. The water contains about 110,000 cu. yd. of silt.

As the lake level slowly falls, hydraulic sluicing monitors are being used on the steeply sloping banks to remove all traces of silt. In all 225 employees are at work on the site and each dredge requires a 12-man crew to move a combined total of 260,000 cu. yds. of material each day.

Power to work this heavy equipment has been furnished by the Hydro-Electric Commission of Ontario. When development first commenced a 115,000 v. transmission line was built between Port Arthur and Moose Lake, four miles to the north of Atikokan. Recent work has made such a heavy demand for power that this line has now been duplicated. At the site of dredging work the 115,000 v. power is stepped down to 13,800 v. to work the dredgers and to lower voltages for general use.

Inland's operation is just part of the large-scale Steep Rock Development. Steep Rock iron ore is in three major bodies, identified as "A", "B" and "C". Inland is developing the "C" section. The first part mined, by Steep Rock Iron Mines, Ltd., was the "B" body, as it was shallower and had less overburden. Water and silt were removed and the first ore was shipped in December, 1944. The water and silt were removed from above the "A" body, and production began in September, 1953.

In 1956, Steep Rock Iron Mines, Ltd., shipped 3,317,000 tons of iron ore. The iron content of the ore being shipped, as well as the ore to be mined by Inland, is 52 to 53 per cent iron. By 1960, Inland expects to produce the first ore from its area, and by 1969 will ship about 3,000,000 tons a year, nearly 50 per cent of Inland's present consumption of iron ore.

When the dredging operation is completed, the Caland property will be a pit 600 ft. deep in places, and stretching two miles in length and a mile in width, with almost perpendicular rock walls.

Construction is now starting on the concentration plant at Steep Rock Iron Mines Ltd. The plant will be able to handle 750,000 tons of crude material during the shipping season and by recovering the iron content from what has hitherto been waste, add important supplementary output to the company's regular production. Estimated cost of the plant is \$2,000,000.

It is anticipated that the plant will go into operation next season and will employ approximately 25 men during the summer. Clearing operations at the site on Steep Rock property and close to the Hogarth open pit, are well advanced. General engineering work has been completed.

The raw material source for the new operation will come from the waste stripped from the flanks of the high-grade deposits, which supply Steep Rock's regular production of direct-shipping, premium-quality ores. Tests showed that this waste contained percentages of high-grade iron which, while variable, were present in sufficient average quantity to make their recovery fully economic. The waste after crushing will be treated in gravity equipment and the final product will be a high-grade iron ore concentrate, at least equal in quality to that resulting from regular mining operations. Since the operation essentially consists of separating the high-grade iron content from the waste, it is primarily an extraction process.

One result of the new industry centred in this region is that the town of Atikokan, which twenty years ago had a population of 300 persons, is now a growing city of 5,000 people. The population is expected to rise to 20,000.

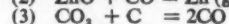
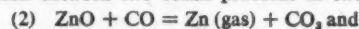
ZINC PRODUCTION—I

Zinc Production in a Blast Furnace

THE characteristics of pyrometallurgical problems of zinc smelting are governed by the facts that zinc oxide is reducible with difficulty and zinc metal is volatile. At atmospheric pressure, zinc oxide can be reduced by carbon only above the boiling point of zinc. Most of the world's zinc is produced in either small horizontal or large vertical retorts, in which the essential reaction is:—



This reaction between two solids proceeds in two stages:



At the temperature (950 deg. C. upwards) at which the gases are generated in the retort, the equilibria in both reactions (2) and (3) are such that the ratio of carbon to

By S. W. K. MORGAN

carbon monoxide is small. Therefore, the gas produced contains but little carbon dioxide, less than 1 per cent, and since the only oxygen available for combining with carbon is that originally combined as zinc oxide, the gas, as shown by equation (1) consists essentially of equal volumes of zinc vapour and carbon monoxide, from which the zinc is condensed by cooling.

The equilibrium in reaction (2) becomes still more displaced to the left as the temperature is lowered. Consequently, as the gases are cooled for condensation, there is some tendency for even the small amount of carbon dioxide present to oxidize the zinc vapour.

A process for smelting zinc in a blast furnace has been developed by the Imperial Smelting Corporation Ltd. after 25 years of study, and two furnaces, with a total daily zinc production of 70 tons, are now in operation at Avonmouth. The charge consists of sinter-roasted concentrates and coke. The furnace gases, which typically contain 5-6 per cent Zn and 8-10 per cent CO_2 , are brought into contact with a shower of molten lead, whereby 89 per cent of the zinc vapour is condensed and recovered as metal. The process can be applied to mixed lead-zinc concentrates, the lead being tapped from the furnace bottom. The carbon consumption is about 104 per cent of the weight of zinc volatilized. Some of the condenser gas is burnt for preheating the air blast to 600 deg. C. and the charge to 800 deg. C.; there is still left an excess of gas equivalent to about 25 per cent of the calorific value of the coke used. Surprisingly, it has been found that no extra carbon is needed for lead production, the lead oxide being exothermically reduced by carbon monoxide. The following article, to be continued subsequently, is condensed from Bulletin of The Institution of Mining and Metallurgy, Vol. 66, Part II.

The overall reaction (1) is the sum of two strongly endothermic reactions (2) and (3). Therefore, in retort smelting a large amount of heat has to be supplied through the retort walls, and the amount of zinc that can be smelted per unit area of retort wall is limited. Consequently, for a long time, all zinc was produced in batch-operated small horizontal retorts, and it was only in 1929 that the New Jersey Zinc Co. overcame a number of major difficulties and developed the first continuous distillation process in large vertical retorts constructed of silicon-carbide bricks; this represented a very big advance, but the output from each of the largest retorts yet built is only 8-9 tons per diem.

Thus, while all the other major metals were being produced from large blast furnaces or reverberatory furnaces, zinc was still being produced in relatively small units.

The first successful process for producing a gas of essentially the same composition as from retorts, but in a large furnace, was the electrothermic method, using the electrical resistance of the charge to supply the heat required, developed by the St. Joseph Lead Co. in 1931. In this process, a single unit produces 50 tons of zinc metal per diem; the charge is preheated and, with a condenser of special design, the process works continuously with a high condensation efficiency.

Before the development of the New Jersey and St. Joseph processes, an entirely new method had been developed in the electrolytic process, in which zinc is deposited on aluminium cathodes from purified zinc sulphate solution. This process, first successfully operated in 1916 at Anaconda, Trail and Risdon, is now widely adopted particularly where power is cheap and plentiful. The rate of growth of the electrolytic process can be gauged from the fact that in 1953, 38 per cent of the world consumption of primary zinc was produced by the electrolytic process and 62 per cent by the retort processes. In spite of the rapid

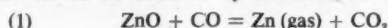
expansion of the electrolytic method, it can be seen that the greater part of the world's zinc is still made by retort smelting.

All retort processes suffer to some extent from the fact that the considerable amount of heat required to carry out the reduction of zinc oxide must be forced through a refractory wall. The St. Joseph process overcomes this difficulty by heating the charge electrically. In the horizontal retort process, the maximum size of retort in common use is one with a capacity of some 2 cu. ft. producing from 50-70 lb. of metallic zinc per 24 hours. A modern horizontal furnace will contain as many as 500 of these retorts, each of which has to be charged and discharged separately.

Experimental Work

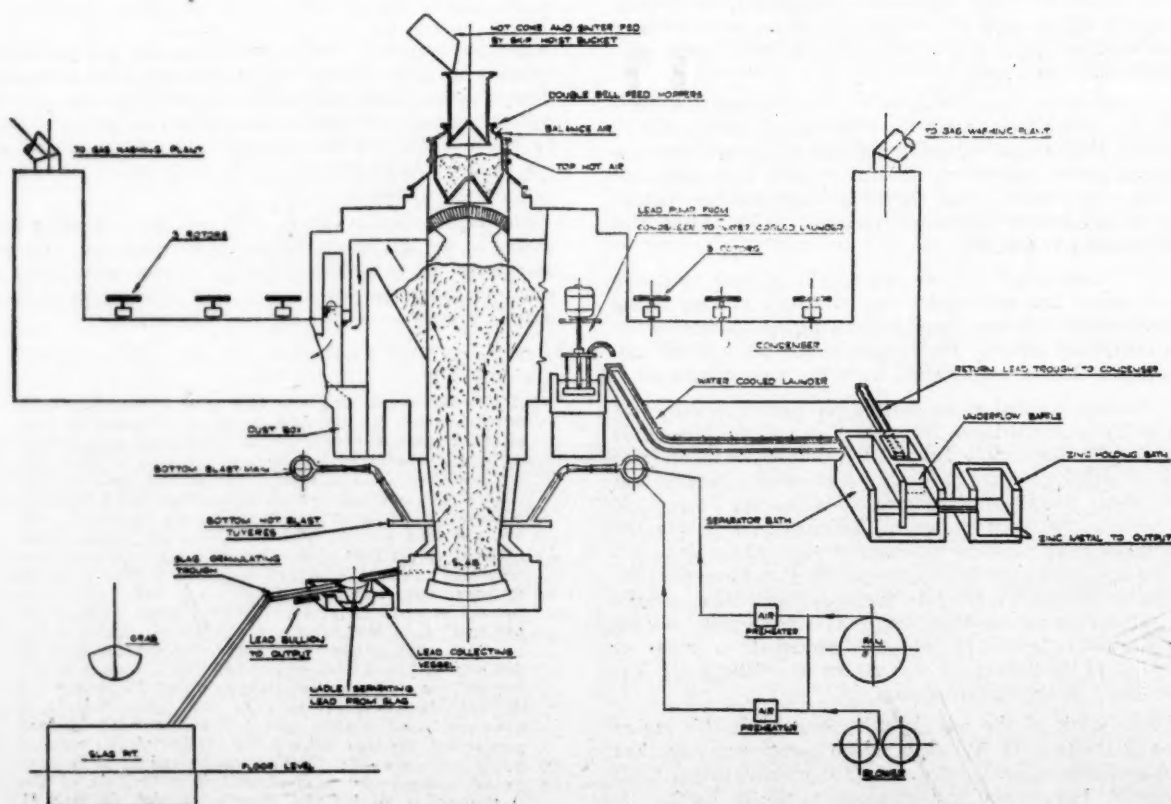
The urge to develop a blast furnace process arose from the hope of developing large units, with relatively low capital and operating costs. The further prospect was envisaged of not being restricted, like retort processes, to treating high-grade concentrates of low iron content, but of being able to treat low-grade mixed concentrates to effect the simultaneous recovery of other metals present, such as lead, silver and copper.

The guiding considerations in the first experiments at Avonmouth were that a ferruginous slag was to be run off from the furnace, and, therefore, the gas initially generated there would initially contain some carbon dioxide; the zinc oxide would be reduced by the reaction:—



and therefore the final gas produced would contain more

Diagrammatic arrangement of zinc blast furnace



Aerial view of the Avonmouth Works of Imperial Smelting Corporation Ltd.



carbon dioxide than zinc vapour. Reaction (1) is reversible, and fall of temperature moves the equilibrium towards the left-hand side of the equation. Consequently, it was realized that special precautions would have to be taken to avoid oxidation of zinc vapour by carbon dioxide at all stages from its generation in the furnace to its condensation:—

- (a) To avoid re-oxidation of zinc within the furnace, the whole furnace charge must be maintained above the zinc re-oxidation temperature;
- (b) To avoid re-oxidation during the passage from furnace to condenser, the gases must not fall below their re-oxidation temperature;
- (c) To avoid re-oxidation in the condenser, the gases must be rapidly cooled.

The first point was met by a design in which a shaft was fed with a mixture of preheated coke and sintered zinc concentrates with air blast introduced both at top and bottom, and the gases withdrawn at a middle level. To meet the second requirement, the gases passed from the furnace through a column of coke heated electrically. A very small furnace was constructed on these lines; the scale was such that continual withdrawal of slag was not possible, so that a limited quantity of charge was treated in campaigns of up to 12 hours' duration.

This unit yielded a gas containing 2.3 per cent zinc vapour and 6.8 per cent carbon dioxide. In the first tests the gases were shock-chilled by being led through narrow water-cooled tubes to produce zinc dust, which was carried forward and collected in filter bags. The fact that this zinc dust contained 98 per cent metallic zinc proved that the means adopted had been adequate to prevent oxidation of zinc vapour before it reached the water-cooled tubes. The next problem was to replace these water-cooled tubes by some form of condenser that would produce liquid zinc.

The key to the development of a successful condenser was the discovery that the use of liquid lead as a circulating medium for heat transfer and collection of zinc enabled oxidation of zinc vapour to be minimized. Liquid lead, even when containing 2.3 per cent zinc, could be pumped and handled with ease, so that the way was opened to the use of a number of devices such as are familiar in the scrubbing of gases by liquids. Particularly promising results were obtained by passing the furnace gas into a chamber containing a pool of liquid lead which was showered into the gas by the action of a rotating fluted roller. Cooling the lead leaving the condenser caused separation of liquid zinc; pumping the lead in a circuit, made up of the condenser chamber, an external cooler, and a zinc separation bath, provided a method of continuous removal of both heat and zinc from the furnace gases and continuous

separation of the zinc as a liquid layer above a liquid lead bath.

From experience on the very small furnace first used, it was possible to proceed to the design of a small continuously operating shaft furnace.

Experimental Zinc Blast Furnace

The furnace on which the process was further developed consisted of a shaft 2 ft. 3 in. x 3 ft. 6 in. with a charge column 10 ft. high, fed with coke and sinter-roasted zinc concentrates, both of which could be preheated, and blown at top and bottom with preheated air. The gas was withdrawn at a mid-level into a column of electrically-heated coke and thence into a condenser with a succession of stages in which showering of liquid lead was maintained by rotating fluted rollers. Lead was pumped countercurrent to the gas stream in the condenser and, outside the condenser, through a cooler and zinc separation bath.

Operation of this experimental plant led to many changes, of both design and procedure, from the initial conceptions. Some of these changes have been simplifications. It has been found possible to operate without the gas conditioning coke column and to condense the zinc from gas produced by blowing the furnace only from tuyeres at the bottom. Thus the shaft furnace can be operated in a manner more nearly approaching the conventional blast furnace operation, with, however, the top of the furnace at a temperature of about 1,000 deg. C.

On this experimental plant the treatment of roasted zinc concentrates was studied in detail. Following this work the extension of the process to other types of charge was explored. These problems were subsequently solved and a situation attained in which the simultaneous smelting of lead imposed no additional burden on the zinc smelting operation. The discovery was made that allocation of coke for smelting the charge could be estimated from the requirements of zinc elimination and slag melting, no extra coke being required for the lead to be treated; the elimination of zinc and the efficiency of condensation was as high as in the treatment of roasted zinc concentrates. The explanation for this surprising feature of lead-zinc smelting was that with lead oxide present in the charge, a still higher carbon dioxide content in the gas could be achieved without increasing the zinc content of the slag. The bullion produced collected the silver content of the charge and a substantial portion of the antimony.

The treatment of low-grade charges was also studied particularly zinciferous lead blast furnace slags and types of low-grade zinc or mixed lead-zinc ores. These types of material were successfully smelted to yield metallic zinc.

Machinery and Equipment

Multi-Purpose Track Maintenance Equipment

A set of permanent-way maintenance equipment recently introduced by Flexible Drives (Gilmans), Ltd., is of interest with reference to opencast mining and quarrying operations, as well as surface installations at underground shaft head areas.

The Flexmaster set of track maintenance equipment consists of a power unit driving, through a flexible drive, a portable hacksaw machine, a light rail-drilling attachment, a sleeper-boring and coach-screw running attachment, a rail-planing device, and handpieces for the free grinding of rails.

A major advantage of the equipment is that only one power unit is needed for all these applications. This will normally be a 220 cc. trolley-mounted petrol engine, but if no heavy drilling is involved, a 120 cc. hand-carried engine is quite adequate. If desired, the equipment can be powered by an air motor or an electric motor through a flexible drive, or in the case of a saw the electric motor or the air motor can be directly mounted on its frame.

The saw unit weighs 122 lb. It can cut through a 113-lb. flat-bottomed rail in about seven minutes and steel sections up to a maximum dimension of 7 in. are within its scope. The driller weighs 30 lb. and is designed to accommodate up to 1½ in. drills. It is tailored to fit the type of rail on which it is to be used.

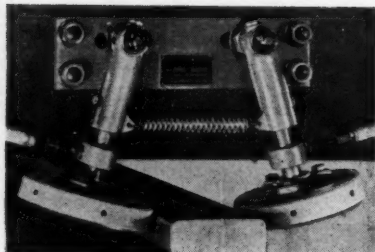
The rail-planing attachment consists of a frame by means of which a ring grinding wheel is precisely located relative to the top of the rail line. The working depth of the wheel can be closely adjusted at will. This attachment is used for accurately restoring the correct level to the top surface of the rail and regaining complete surface alignment from rail to rail. It has already been well proved in practice where the welding up of rails into continuous lengths has been undertaken on a large scale. The weight of the unit is 60 lb.

With various other handpieces and

attachments, the power unit and flexible drive can be used in the workshops for many other purposes, such as surface scaling, wire brushing, sanding, polishing, buffing, drilling and tube cleaning.

CRANE LUBRICATION

A new system of combined automatic crane and crane rail lubrication is announced by Centralube, Ltd. The manufacturers claim that this method not only provides automatic lubrication to rails, but also to all bearings of the crane, i.e.,



wheel and long travel bearings. The system, therefore, has obvious applications in opencast mining and quarrying, as well as in ore loading or surface yard applications.

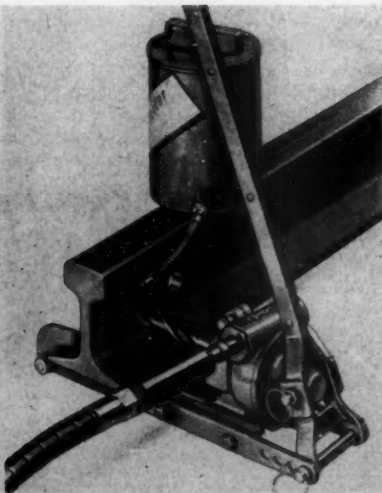
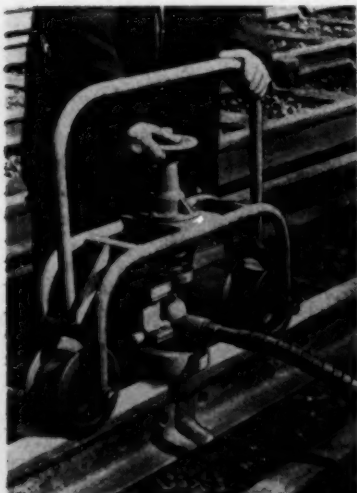
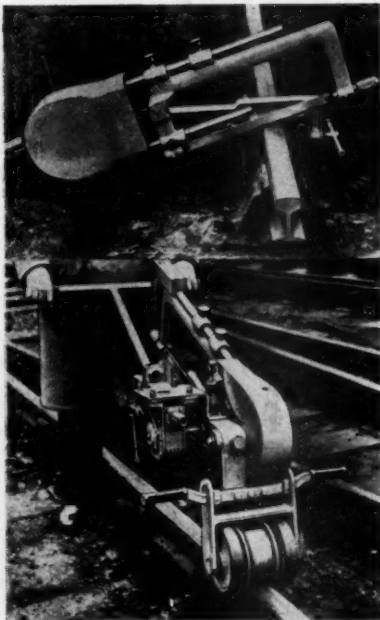
Due to the fact that the lubricator is actuated by an eccentric drive from the long travel shaft, and consequently operates only when the crane operates, over-feeding is impossible. The amount of lubricant applied to the rail is stated to be in the region of between 3 and 6 grams per hour of long travel operation.

A further innovation by the manufacturers is a new and strengthened crane rail applicator. In addition to a stronger baseplate, soft iron supporting plates are provided on either side to the application felt roller.

A NEW MINE TELEPHONE

Mechanization at pit bottom and other underground areas results in greatly increased noise, and it is consequently necessary to introduce some form of speech reinforcement for the conventional underground telephone system at important points such as tippers, loading stations, transfer stations, and near the work face. The B.T.H. Portavox amplifier and loudspeaker have been developed specially for this purpose and are now in production.

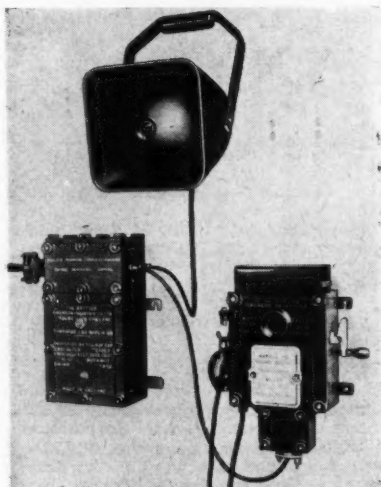
The equipment is installed in addition to the mine telephone, and serves to amplify and reproduce through a loudspeaker the signals normally reproduced by the telephone earpiece, so that communication can be established under very difficult conditions. Intensive development has enabled the equipment to be offered as intrinsically safe and flame-proof, certificate number IS 1066 and FLP 3832/A having been granted by the Ministry.



Top : The Centralube crane rail applicator

Centre : Above is the rail sawing attachment by Flexible Drives Ltd., and below the same attachment with bogie for running along rail on ground

Bottom : At left the planing attachment, and at right the drilling attachment showing detachable handle and coolant feed



In operation, the caller rings the bell of the telephone in the usual way and speaks into the mouthpiece. The speech is reproduced by the loudspeaker at the reception point where the Portavox is installed, but when the earpiece is lifted from the hook of the receiving telephone so that a reply can be given through the mouthpiece, the amplifier is cut off and the signals are reproduced in the normal manner by the earpiece. Loudspeaking communication can thus be achieved over the normal telephone circuit by holding the earpiece hook down when receiving a message and releasing it when speaking into the mouthpiece.

The equipment is mains-operated from 110 or 240 volt 50 cycle A.C. supplies. The amplifier is resiliently mounted within the flameproof enclosure and suitably certified terminations are provided for connections.

The loudspeaker assembly is part of the intrinsically safe equipment and consequently special fire-resisting material—resin-bonded glass fibre laminate with suitably adjusted ingredients—has been used for the re-entrant type horn, which will neither support combustion nor produce thermite reaction on impact. Perhaps the most important feature of the B.T.H. Portavox system is its ready application to party-line circuits, where code ringing is necessary.

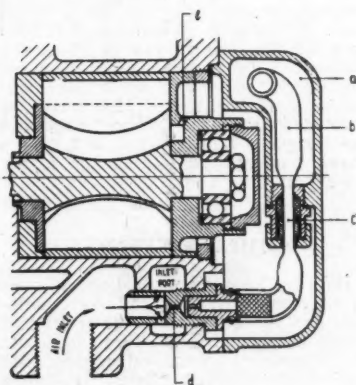
LUBRICATING AIR DRILLS

The lubrication system patented by Victor Products (Wallsend), Ltd., comprises a reservoir (a), containing approximately 150 cc. of oil and a wick (b). This wick is led through the reservoir wall by way of a very tight-fitting gland (c) into the end cover of the machine. The end of the wick houses an air filter and is connected to the air inlet to the machine via a very small borehole (d) in the volume control unit. The air in the end cover is in communication with the rotor vanes via the holes (e) in the end bracket.

When the machine is in use, a small quantity of air passes through hole (d)

and the air filter into the end cover, and starts to build up air pressure first in the end cover and then via gland (c) in the oil reservoir itself. On stopping the machine the air pressure in the main air passages falls immediately to that of the atmosphere. The air pressure built up in the oil reservoir can only leak slowly away, however, due to the gland (c), and as it does so it forces oil with it through the gland on to the part of the wick in the end cover.

On restarting the machine air again passes through hole (d) and the air filter into the wick. This filtered air blows the collected oil off the wick and carries it as a fine mist through the holes (e) into the rotor. Here it is fed behind and around the vanes, both lubricating them and forcing them outward against the cylinder liner.



In this way oil is applied to the vanes when it is required, i.e., to reduce starting friction, but is conserved at other times.

WINDING AT MANVERS MAIN

As part of the recent modernization scheme carried out by the N.C.B. at Manvers Main Colliery in the N.E. Division, No. 3 Area, two winding engines have been installed to serve Nos. 2 and 3 shafts. The mechanical parts of these machines were manufactured by the Fraser and Chalmers Engineering Works of The General Electric Co., Ltd., and the whole of the electrical equipment to drive and control them was built by the Witton Engineering Works of the G.E.C.

Both winders have drums of the bicylindro-conical type and are driven by a.c. slipring motors. The machine installed at No. 2 shaft is designed to raise coal from a depth of 1,143 ft. in skips at the rate of six tons per wind, giving an hourly rated output of 415 tons. The diameters of the drum are 12 ft. at the smallest dimension, and 18 ft. at the largest. Cheeks and cones are of cast iron construction and the shell plate over the 18 ft. portion of the drum is fabricated. Drive is transmitted to the drum through a spring-type flexible coupling and double helical reduction gearing. A synchronous speed of 375 r.p.m. is obtained by a 3.3 kV. slipring motor with a full-load rating of 1,550 h.p.

Pressure-applied mechanical braking as developed by the Fraser and Chalmers Engineering Works is employed on both winding engines and the brakes are fitted with Ferodo linings.

Construction and specification of the winding engine installed for No. 3 shaft are similar to that serving No. 2 shaft, but it is larger, being capable of raising eight tons of coal per wind in skips with an output of 380 tons per hour from a depth of 2,118 ft. The winders serving these shafts are also employed in raising coal from two adjacent pits in the Area, which are connected underground to the Manvers Main workings.

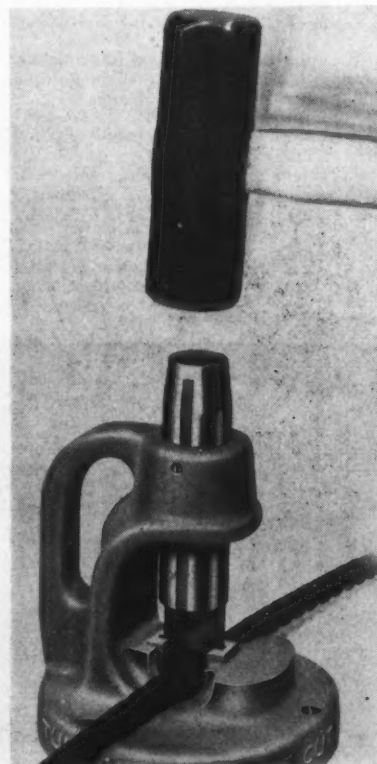
The No. 3 shaft winder drum has a small diameter of 13 ft. and a large diameter of 20 ft. and is driven by a 2,250 h.p. (3,440 h.p. peak) 375 r.p.m. motor. Control gear for this motor is similar to that provided for the No. 2 winder.

A WIRE ROPE CUTTER

The Tullcon wire rope cutter, manufactured by Tulloch Construction Co., Ltd., is a lightweight portable cutter designed to cut all kinds of wire rope cleanly and without distortion up to the capacity of the cutter used. The use of the tool in mining is immediately apparent.

The only tool required to operate the Tullcon cutter is a heavy hammer. The cutting blades are made from tough steel and are easily replaced when necessary. Spares are always available and are inexpensive.

Tullcon cutters are made in three sizes: First, at 11 lb., dimensions 4 in. by 6½ in. A small portable cutter which will cut any steel rope up to ¾ in. diameter. This cutter can be carried around in a tool box. Second, 21 lb., dimensions 7 in. by 7 in. A heavier unit designed to cut wire ropes up to 1 in. diameter. Third, 36 lb., dimensions 9 in. by 9 in. A unit designed to cut ropes up to 1½ in. diameter.



Top: The Portavox mine telephone
Centre: The Victor Lubrication System
Bottom: The Tullcon wire rope cutter

MINING MISCELLANY

Imperial Chemical Industries, Ltd., has given £25,000 to Sheffield University towards the cost of building extensions to the Departments of Chemistry, Fuel Technology, and Chemical Engineering.

★

A delegation of coal-mining companies from the U.S., on a return visit to Poland, concluded their tour of Silesia on July 13. They studied the problems of the Polish coal-mining industry and visited seven collieries.

★

Geological surveys have confirmed the existence of substantial iron ore deposits in various parts of Thailand. From the latest available report, however, agreement does not appear to have been reached with the Krupp company as yet on the use of their services in connection with the construction of a steel mill.

★

Sir James Bowman, chairman of the National Coal Board, recently visited the board's mining research establishment at Isleworth, Middlesex, to open new laboratories. Their completion marks the final stage in a programme to convert what was formerly a film studio into a research establishment.

★

New mining companies in the Dominican Republic, financed by local and foreign capital, have substantially increased exports of iron ore. Last year, 164,000 tons of ore valued at \$2,281,000 were extracted, all of which was exported to the U.S. and Belgium. Production in 1957 will be doubled, due to the installation of new machinery and the discovery of important deposits in several areas.

★

Mr. John Doyle, president of Canadian Javelin, has announced that operations are to start immediately at Julian Lake, Labrador, for development of the company's subsidiary, Julian Iron Corporation. It is expected that gross output from future developments at this property will eventually exceed 20,000,000 tons annually.

★

Dr. R. L. Cunningham, chief scientist at the Department of Mines' metallurgy

research laboratory in Ottawa, has stated that, theoretically at least, metals hundreds of times stronger than existing ones could be produced if the imperfections within crystal and atomic structure could be eliminated. Dr. Cunningham was one of 700 delegates from 28 countries attending a convention of crystallographers in Montreal.

★

The Benguela Railway, which links Lobito harbour on the West Coast of Africa with Katanga and Northern Rhodesia, carried 1,424,000 tons of goods in 1956—an increase of nearly 20 per cent over the record set up in the previous year. Of this total an amount of 721,000 tons was on its way to or from the Belgian Congo and Northern Rhodesia. The bulk of this traffic, which has multiplied seven times in the past decade, is accounted for by the Belgian Congo, but the Benguela Railway is now taking a growing quantity of Rhodesian copper for export from Lobito.

COMPANY EVENTS

Effective from August 6, 1957, all sales of Challenger tractors and correspondence relating thereto are to be centralized in Gainsborough, Lincs. From that date all communications should be addressed to Marshall-Fowler Sales, Britannia Works, Gainsborough, Lincs. Telephone Gainsborough 2301; cables, Marshalls Gainsborough. The service and spares departments of John Fowler and Co. (Leeds), Ltd., will continue to operate from Leeds.

★

A new division specializing in extractive metallurgy, particularly as it applies

to the rarer metals, has been established by J. F. Pritchard and Co., of 4626 Roanoke Parkway, Kansas City, Missouri. The new division will be under the supervision of Mr. H. M. Low, manager of Pritchard's power division. To assist in its development the company has retained the services of two nationally recognized Pittsburgh consultants, Mr. J. A. Patterson and Mr. Edward W. Hopper.

★

Leopold Lazarus, Ltd., have been appointed sole representatives in Great Britain of the National Steel Corporation of Pittsburgh, U.S.A., comprising the Great Lakes Steel Corporation, the Weirton Steel Co., the Hanna Furnace Corporation, etc. National Steel Corporation has an annual steel ingot capacity of approximately 6,300,000 tons, which will rise to over 7,000,000 tons during 1958. Among its principal products are pig-iron, hot and cold rolled sheet and strip, tinplate, and galvanized sheet.

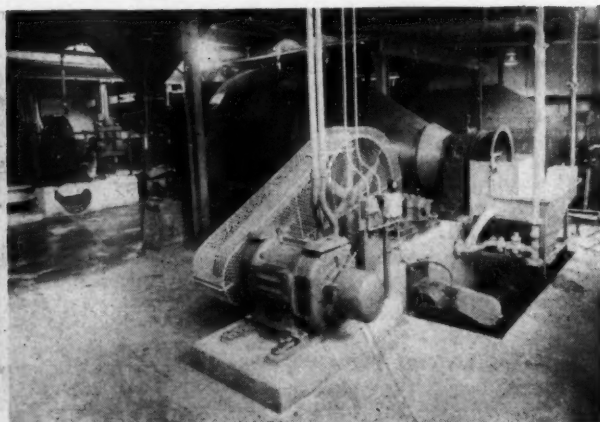
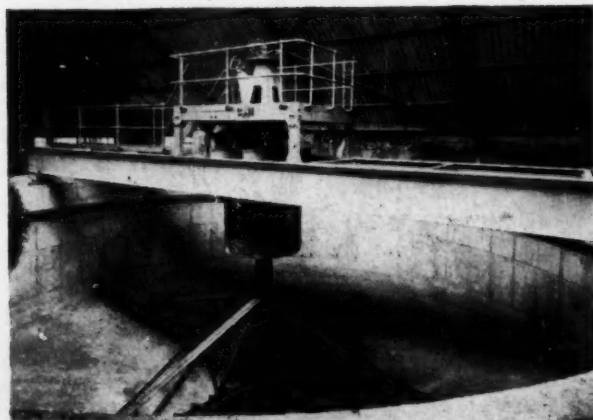
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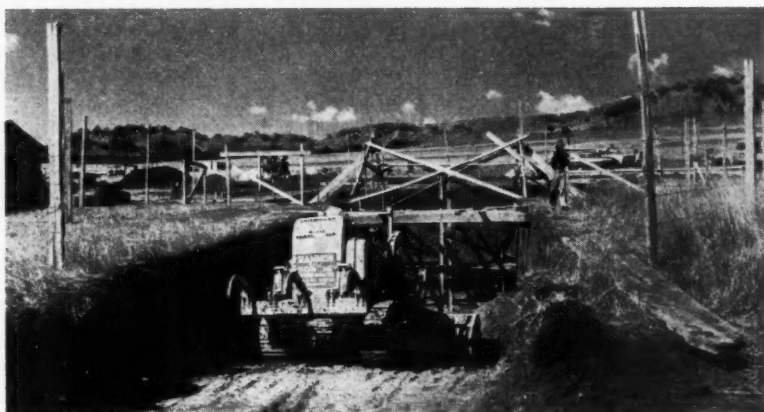
Three companies have recently joined together in a consortium to explore the South American markets for contractors' plant and construction equipment. They are Chaseside Engineering Co., Ltd., R. H. Neal and Co., Ltd., and Frederick Parker, Ltd. Mr. Maxwell Heckman has been appointed by the consortium as resident representative and is now touring South America. He will be the liaison between the manufacturers and their local distributors in the various South American countries.

★

Chamberlain Industries, Ltd., of Staffa Works, Staffa Road, Leyton, London, E.10 (one of the Chamberlain group of companies), have appointed Hailes Plant Sales and Hire, Ltd., of 81 Great King

In our issue of August 2, a note on page 136 described the range of filter plants manufactured by William Boulton Ltd., with particular reference to a filtration plant for the French coalfields. The illustrations below show two installations by the same manufacturers in the United Kingdom. At left, a centre-drive thickener for treating ground flint from a continuous grinding circuit plant. This is a special design, as the thickened slurry is pumped up the centre of the main shaft. The unit is operated by the Longport Mill Co. At right, a conical pebble mill powered by 80 h.p. M-V motor, wet grinding flint in continuous close circuit. This machine is working with a classifying unit of 92 per cent efficiency at Furlong Mill Ltd.





The scene near Carletonville, some 50 miles west of Johannesburg, where shaft sinking operations began on Wednesday, July 24, at the new Western Deep Levels Mine, which will eventually be the deepest mine in South Africa. Sir Ernest Oppenheimer (chairman of Anglo American Corporation of South Africa) inaugurated this enterprise by pressing a button, setting in motion four diamond drills at No. 2 Shaft. It is anticipated that mining will eventually be carried to a final depth of 12,500 ft. below the surface

Street, Edinburgh, 3, and Royal Exchange Buildings, Glasgow, C.2, as their Scottish distributors and to handle the sales of both "Jenbagh" diesel-driven air compressors and the "Staffa" range of mobile and shop cranes.

★

A company known as the Bahamas International Trust was formed early this year in Nassau, Bahamas, to conduct financial, trusteeship and general investment business. The new institution is sponsored by Barclays Bank D.C.O., Hambros Bank, Robert Fleming and Co., the Royal Trust Co. of Canada, London, Anglo American Corporation of South Africa, Ltd., Empire Trust Co. of New York, Royal Trust Co. of Montreal, and E. D. Sassoon Banking Co. of Nassau. The company has an authorized capital of £1,000,000, of which £200,000 has been issued and paid at a premium of 50 per cent. Mr. Hugh Wright has been appointed manager. One of the most important services rendered by the company is likely to be that of company managers.

★

Davies Magnet Works Ltd., of London Road, Ware, Herts, have completed arrangements for their magnetic separators to be produced and marketed in Australia by the Star Machinery Pty. Ltd., 194/218 Lawrence Street, Alexandria, N.S.W. Initially, the Star Machinery Pty. Ltd. are commencing with the standard production of the model 50 magnetic separator, but facilities are available to them to have call at any time in the future on full production designs and layouts covering the full range of separators manufactured by the Davies Magnet Works.

PERSONAL

The board of the Rio Tinto Mining Co. of Canada announce that the Hon. Robert Winters has accepted their invitation to become president, and will be taking up office on September 9, 1957. Mr. J. N. V. Duncan, the outgoing president, who is also managing director of the Rio Tinto Co. of London, will remain on the board of the Rio Tinto Mining Co. of Canada.

Mr. L. C. Walker has resigned from the boards of Nigel Van Ryn Reefs, Ltd., and Witwatersrand Nigel, Ltd.

★

The board of Witwatersrand Nigel, Ltd., has announced the death of Mr. F. E. Wigley on August 1, 1957.

★

Mr. T. P. Patterson has resigned from the board of Clutha River Gold Dredging, Ltd. Mr. Ian Leslie Patterson has been appointed a director.

★

Mr. J. N. Davies has been appointed a director of Pahang Consolidated Co., Ltd.

★

Mr. A. Walsh, director-general, Industrial Relations Department, has been appointed deputy chairman of the South-Western Division of the National Coal Board in succession to Mr. H. Lyn Jones, who is to retire on October 31, 1957. He will take up his appointment in November.

★

Mr. L. C. Walker has resigned from the board of Oceana Development Co. Ltd.

★

Major A. C. Herring, V.C., has been appointed chairman of The Central Pro-

vinces Manganese Ore Co. Ltd. He succeeds Mr. H. R. Holmes, who has retired as chairman, but remains on the board.

★

Mr. S. J. Wrigglesworth has been appointed deputy managing director of Oldham and Son, Ltd. Mr. Orlando Oldham, son of the chairman, has been appointed as Mr. Wrigglesworth's personal assistant.

★

An exhibition of tin mining in Malaya is being held at Malaya House, Trafalgar Square, London, and will remain open throughout August. It has been organized jointly by the Government of the Federation of Malaya and the Tin Industry (Research and Development) Board of the Federation of Malaya. The principal methods of mining employed in Malaya today are depicted.

OBITUARY

Mr. L. K. Brindley

The death has occurred of Mr. L. K. Brindley, consultant to the president of the International Nickel Co. of Canada, Ltd., who at his retirement last February was deputy chairman of the Mond Nickel Co., Ltd.

Born in Dublin, 1887, Mr. Brindley graduated at Trinity College with distinction. During the 1914-18 war he served in the Ministry of Munitions and was awarded the M.B.E. After the war he joined Brandeis Goldschmidt and Co., Ltd., becoming managing director, an appointment which he held until the second world war claimed his services in the Ministry of Economic Warfare. Towards the end of the war he became president of the Falconbridge Nickel Co. in Toronto. He became a director of Mond in December, 1948, managing director in January, 1951, and deputy chairman in May, 1955.

At the time of his death Mr. Brindley was a director of the Anglo Metal Co., Ltd., and also deputy chairman of the Council, Copper Development Asscn.

AGENCY WANTED

Warsop Power Tools, Ltd., 42 Northline Road, Toronto 16, are interested in obtaining the exclusive Canadian representation of U.K. manufacturers for light engineering equipment suitable for the construction, mining, public utilities, building, demolition and earth-breaking industries and trades. B.O.T. Ref.: E.S.B. 5924/57. Telephone enquiries to Chancery 4411, extension 776 or 866.

CONTRACTS AND TENDERS

The following future procurements have been announced by the International Co-operation Administration:

	Contract Period	Terminal Delivery Date	Amount (in U.S. dollars)
<i>Spain</i>			
Aluminium and aluminium base alloys and aluminium products	28/6/57-		
(PA No. 52-691-99-J5-7247)	31/12/57	30/6/58	4,000,000
Copper and Copper Products	28/6/57-		
(PA No. 52-692-99-J5-7246)	31/12/57	30/6/58	6,000,000
<i>Turkey</i>			
Construction, mining and conveying equipment	29/4/57-		
(PA No. 77-99-H8-7244)	30/11/57	31/5/58	50,820
Construction, mining and conveying equipment	28/6/57-		
(PA No. 77-99-H8-7266)	31/12/57	30/6/58	230,000
Construction, mining and conveying equipment	28/6/57-		
(PA No. 77-99-H8-7262)	31/12/57	30/6/58	300,000

B.O.T. Ref.: E.S.B. 18062/57 I.C.A. Telephone enquiries to Chancery 4411, extension 354.

Metals and Minerals

INCO's Big Selling Task

Commenting on the rejection early in July of the request that the U.S. Government buy nickel for stockpiling from International Nickel's new development in Manitoba, the president of the company, Dr. Henry S. Wingate, told a press conference that Inco would have to find new markets for its rapidly increasing output. He expressed the opinion that the U.S. and British Governments would go completely out of the market, and would try to divert nickel to civilian industry.

"If we don't go to sleep on the job", he added, "the gap between the present total annual consumption of 187,500 s.tons and the expected total annual production—in 1960—of 387,500 s.tons can be closed." Potential civilian markets could include the automotive field and other industries using stainless steel, coinage, atomic energy projects, and the electronics and radar fields.

No thought is at present being given to lowering the price of nickel, such a move being regarded as too dangerous at the present time.

COLUMBIUM POSITION REVIEWED

More than two years have elapsed since the U.S. Government announced that it would neither renew existing contracts for columbite nor enter into fresh commitments for the purchase of this material for the stockpile. Though some producers held contracts valid until the end of 1956, the sudden termination of the U.S. buying programme meant that the majority of them were compelled to find buyers wherever they could.

Of more than usual interest, therefore, is a review of the U.S. and world industry, compiled by the Bureau of Mines. World production of concentrates decreased 17 per cent from the record year of 1955, falling from 5,780 s.tons to 4,820 tons. This decline is attributed to the cessation of U.S. Government orders, although world totals for 1956 still included reduced deliveries being made to G.S.A. under prior commitments to buy.

United States domestic consumption, as measured by the metal content of mineral concentrates and metal-bearing tin slags, is estimated to have risen by about 40 per cent during the year. This increase, though not enough to offset the loss of U.S. Government orders, is at any rate an encouraging indication of columbium's potentialities for future expansion.

Factors which encouraged consumption were increased availability of raw materials, new production facilities, and easing of ore prices. Impetus was given for increased future use by cancellation of Department of Defence directive 4,000-16, which previously had restricted the amount of columbium permissible for use in jet engines.

In contrast to the situation overseas, U.S. domestic production of columbium-tantalum mineral concentrates increased by no less than 1,700 per cent in 1956. This tremendous growth in mine shipments was due to the euxenite placer

mine at Bear Valley, Ohio, which during its first full year as a producer accounted for more than 99 per cent of the national total. All the euxenite concentrates were processed further by Mallinckrodt Chemical Co. to separate columbium-tantalum, uranium, rare earth and thorium products. The columbium-tantalum and uranium products were purchased by the Government under terms of a special contract. In October, 1956, the A.E.C. stimulated domestic production by requesting bids from producers for the delivery of 7½ tons of high-purity columbium.

Despite the success of the Government in fostering the exploitation of domestic resources, U.S. production still remains on far too small a scale to constitute a serious threat to suppliers overseas, the entire 1956 output amounting to only 106 s.tons. This compares with last year's imports of 2,849 s.tons, of which Nigeria supplied 1,796 tons, the Belgian Congo 370 tons, Malaya 261 tons, Norway 260 tons, and Brazil 80 tons. Tantalite imports were 656 s.tons, the largest suppliers being the Belgian Congo (476 tons) and Brazil (70 tons).

As was to be expected, non-Government buyers were in no hurry last year to purchase their forward requirements, preferring to wait until the market had settled down at a more realistic level, following the withdrawal of the 100 per cent bonus which had hoisted prices to over £2,000. Though the period of readjustment has been long and painful, the outlook for columbium producers is gradually brightening. There is no doubt that columbium has a promising future as a high-temperature material for the new jet age, while it has lately been widely publicized in connection with Britain's plans for nuclear power generation, notably as the "canning" material for the Dounreay fast breeder reactor. U.S. research has indicated the possibility that niobium alloys capable of operating at 1,200 deg. C. may be produced in due course.

RUTILE PRICES UNECONOMIC

Further declines have been recorded in Australian rutile shipment prices. These currently range from £50 to £54 per ton c.i.f. for minimum 95 per cent, but are considered to be still largely nominal in the virtual absence of fresh buying. It has, in fact, been reported that in some instances consumers have requested deferment of shipments.

Prices are now back to the levels prevailing at the end of 1954 and are believed to be uneconomic for all but the larger Australian producers. It is rumoured that this state of affairs has prompted some agitation on the part of the producers for the Australian Government to take steps to prevent prices falling any further. It seems probable, however, that any attempt to stabilize prices would present considerable difficulties at the present time, especially in view of the fact that production of titanium ore is being expanded in other parts of the world.

PURE BORON

Pure boron is now being manufactured in the U.K. by Borax Consolidated, Ltd. The chemical is being produced in crystalline elemental form in a purity ranging from 99 to 99.7 per cent. This extra-pure material is expected to be particularly suitable for incorporation in alloys. It is likely to be of considerable interest to the electrical and metallurgical industries.

HARD TIMES FOR TUNGSTEN

The market for tungsten ore in the U.S. remains currently very weak with imported ore probably available as low as \$15 per s.ton, to which must be added nearly \$8 per unit import duty. The market values are at the lowest since about the mid-1930's. The U.S. Government no longer has provision for buying tungsten for its already sizeable stockpile and consumption remains at a low level. Tungsten, refined 98.8 per cent, was nominally quoted in New York yesterday at \$3.50 per lb., compared with \$3.75 previously.

In London, dealers are quoting 110-115s. per 1-ton unit c.i.f. Europe for minimum 65 per cent material, which compares with 272s.-276s. at the beginning of 1956, and business is still fairly quiet.

Over the years tungsten has proved very sensitive to economic conditions, strategic developments, and other factors. In view of the world's growing need for high temperature and special metals for jet engines, guided missiles, and nuclear plants, it is evident that tungsten's recovery—quite apart from the effects of the present low prices on world production—cannot be indefinitely delayed. It remains to be seen how much further the price will fall before the swing of the pendulum is at last reversed.

SILVER RISES IN NEW YORK

On July 31 increased domestic demand forced an increase in the New York price of silver to 91½ c. an oz.—up five-eighths of a cent from the level which had prevailed since June 14. Sales at the new rate jumped to 400,000 oz. locally and 100,000 oz. out-of-town. On August 6, continuation of comparatively heavy demand finally brought another ½ c. increase to 91½ c. an oz. The current price rise stems from heavier European demand, especially in Western Germany, a modest seasonal increase in buying by U.S. industrial users and silverware makers, and the re-opening of several plants after their summer vacations.

BERYLLIUM'S PROSPECTS

A company, to be known as Utah Beryllium, Inc., has been formed to mine and mill beryllium ore deposits located on properties in the Sheeprick Mountains of Western Utah. There are believed to be more than 100 mines in the U.S. producing beryl. Production is centred mainly in South Dakota and New Mexico. Estimated mine production last year was 550 tons as compared with 100 tons in 1948.

The U.S. Government is understood to be continuing its long-term beryllium stockpiling programme. A supplemental stockpile programme has also been authorized.

The Beryllium Corporation of Reading, Pa., has officially opened its \$4,500,000 plant at Reading, Pa. Over the next five years it will produce for the A.E.C. high-grade beryllium metal valued at some \$23,000,000.

Beryllium metal in the form of metal lumps or pebbles is currently priced in the U.S. at \$71.50 per lb. The price range over the past ten years has been between this level and about \$65.0. If lower prices could be developed, beryllium would be placed in more direct competition with other metals in many applications, where its favourable strength-weight ratio and high melting point make it desirable. The outlook for the industry is for expanded utilization of the metal and its alloys.

COPPER · TIN · LEAD · ZINC

(From Our London Metal Exchange Correspondent)

Markets have been under the influence of the holiday season and price movements have been small with a slightly better undertone for lead and zinc, whilst the copper and tin markets have tended to recede.

TOO MUCH PRODUCTION

The major item of news in the copper market came on Tuesday with the announcement that the American primary producers were reducing their price to 28½ c. per lb., and although Customs Smelters have not yet reacted, it is expected that their price will also be reduced, as a differential of ¼ c. per lb. is not normally considered sufficient. In some circles it has been pointed out that as the primary producers have instituted an energetic campaign to sell copper to

consumers, the market for Customs Smelters' copper is very much smaller than it was, and the downward movement in prices may therefore continue, as it is to be appreciated that Customs Smelters have very little interest in the actual price of copper so long as they can buy their raw materials at a reasonable margin.

In London the contango has increased again and stocks on Monday amounted to the post-war record of 12,345 tons, and it is expected that the figure will continue to grow and the contango to increase until finance houses become interested in financing the metal. The R.S.T. price was unchanged over the week-end, but with the cash price now at the £210 per ton level, it would not be surprising if a reduction were to take place over this week-end.

It must be remembered that demand in general remains good. In Europe it is running at about the same level as last year; while in the U.S., although intake is about 20 per cent down, this in the main appears to reflect a running down of stocks rather than a decrease in consumption. The worst that can be said of world consumption is that there has been a pause in its progressive expansion, and, as Sir Ernest Oppenheimer pointed out earlier this week, there is good reason to expect that demand for copper will once again expand provided there are no industrial setbacks. Meanwhile, there are no signs as yet of further curtailments in production, and some quarters feel that a further month must elapse before this happens.

TIN "BACK" DISAPPEARS

The undertone of the tin market has been weak and on Wednesday the back-wardation disappeared under the influence of increased stocks in warehouse in this country, which now amount to over 3,000 tons. As expected, the communiqué issued at the end of the meeting of the International Tin Council did not contain anything startling, the main points being reallocation of consumer votes; the information that the Canadian authorities did not at the moment visualize selling their non-commercial stocks of tin at prices below the upper third of the existing price range of the Buffer Stock Manager, and the information that the Buffer Stock had no stocks of metal as at March 31.

Fears that Indonesia would ship less tin this year than last have been dispelled, as the total of tin-in-ore shipped during the first six months amounted to 12,042 tons as against 13,606 tons during the corresponding period last year. On Thursday morning the Eastern price was equivalent to £752 per ton c.i.f. Europe.

LEAD AND ZINC FIRMER

The lead and zinc markets have shown a firmer undertone with reports that demand in America is better than was expected and with a realization that the closures of the various zinc outputs will have an appreciable effect on the supply-consumption picture. The production of lead in O.E.E.C. countries during June amounted to 45,640 tonnes, as opposed to 50,822 tonnes in May, and in zinc the June production was 68,038 tonnes against 73,284 tonnes in May.

Closing prices and turnovers are:

THE WEEK ON THE L.M.E.

	Aug. 1		Aug. 8	
	Buyers	Sellers	Buyers	Sellers
COPPER				
Cash	£213	£213½	£209½	£209½
Three months ..	£215½	£216	£212	£212½
Settlement ..		£213½		£209½
Week's turnover ..	5,550 tons		5,750 tons	
LEAD				
Current ¼ month ..	£91½	£91½	£91½	£91½
Three months ..	£91½	£92	£91½	£91½
Week's turnover ..	4,175 tons		2,400 tons	
TIN				
Cash	£744	£745	£738½	£739
Three months ..	£742½	£743½	£739	£739½
Settlement ..		£745		£739
Week's turnover ..	820 tons		530 tons	
ZINC				
Current ¼ month ..	£72½	£72½	£72½	£73
Three months ..	£72½	£72½	£72½	£72½
Week's turnover ..	5,700 tons		3,725 tons	

LONDON METAL AND ORE PRICES, AUGUST 8, 1957

METAL PRICES

Aluminium, 99.5%, £197 per ton
Antimony —
English (99%) delivered, 10 cwt. and over £210 per ton
Crude (70%) £200 per ton
Ore (60%) bases 23s. 6d./24s. 6d. nom. per unit, c.i.f.

Arsenic, £400 per ton
Bismuth (min. 1 ton lots) 16s. lb. nom.
Cadmium 12s. 0d. lb.
Cerium (99% net), £13 18s. lb. delivered U.K.
Chromium, Cr. 99% 7s. 2d. lb.
Cobalt, 16s.-19s. lb.
Germanium, 99.99% Ge. kilo lots 3s. 4d. per gram
Gold, 251s. 4½d.

Iridium, £27/29 oz. nom.
Lanthanum (91/99%) 15s. per gram
Manganese Metal (96%-98%) £310
Magnesium, 2s. 5½d. lb.
Nickel, 99.5% (home trade) £600 per ton
Osmium, £20/22 oz. nom.
Osmiridium, nom.
Palladium, £7 10s./£8 0s. oz.
Platinum U.K. and Empire Refined £31/£34 oz.
Imported £29 0s./£30 0s. nom.
Quicksilver, £87 ex-warehouse
Rhodium, £42 oz.
Ruthenium, £15/£17 oz. nom.
Selenium, 7s. nom. per lb.
Silver, 78½d. f. oz. spot and 78½d. f'd.
Tellurium, 15s. 16s. lb.

ORES AND OXIDES

Bismuth	65% 8s. 6d. lb. c.i.f.
.. .. .	20% 3s. 3d. lb. c.i.f.
Chrome Ore—	
Rhodesian Metallurgical (semifriable) 48%	£19 5s. 0d. per ton c.i.f.
.. .. .	£19 5s. 0d. per ton c.i.f.
.. .. .	£13 0s. 0d. per ton c.i.f.
.. .. .	£18 0s. 0d. per ton c.i.f.
.. .. .	£12 0s. 0d. per ton f.o.b.
.. .. .	185s./197s. 6d. per unit
Fluorspar—	
Acid Grade, Flotated Material	£22 13s. 3d. per ton ex. works
Metallurgical (75/80% Ca F ₂)	156s. 0d. ex. works
Lithium Ore—	
Petalite min. 3½% Li ₂ O	47s. 6d./52s. 6d. per unit f.o.b. Beira
Lepidolite min. 3½% Li ₂ O	47s. 6d./52s. 6d. per unit f.o.b. Beira
Amblygonite basis 7% Li ₂ O	£26 5s. per ton f.o.b. Beira
Magnetite, ground calcined	£28 0s./£30 0s. d/d
Molybdenite (85% basis)	£21 0s./£22 0s. d/d
.. .. .	8s. 5d. nom. per lb. (f.o.b.)
Titanium Ore—	
Rutile 95/97% TiO ₂ (prompt delivery)	£51/£54 per ton c.i.f. Aust'n
Ilmenite 52/54% TiO ₂	£11 10s. per ton c.i.f. Malayan
Wolfram and Scheelite (65%)	110s. 0d./115s. 0d. per unit c.i.f.
Manganese Ore Indian	
Europe (46%-48%) basis 130s. freight plus 5% surcharge	131d./133d. per unit c.i.f.
Manganese Ore (43%-45%)	106d./108d. per unit c.i.f.
Manganese Ore (38%-40%)	100d./102d. per unit
.. .. .	(including duty)
Vanadium—	
Fused oxide 90-95% V ₂ O ₅	£12½-£13½ per unit c.i.f.
Zircon Sand (Australian) (65-66% ZrO ₂)	£19 per ton c.i.f.

Mining Finance

Nchanga's Strong Ore Reserve Position

Total ore reserves of Nchanga Consolidated Copper at the end of March last have been estimated at 164,000,000 tons, indicating a mining life of nearly 40 years. These estimated reserves, Sir Ernest Oppenheimer states in his review accompanying the full report and accounts of Nchanga Consolidated, are likely to be increased as further exploration and development work is completed.

The year to March 31, 1957, is described as one of considerable activity; a most satisfactory increase took place in the productive potential of Nchanga and in its ore reserves, while the technical progress has been impressive. The ore treatment plant is being expanded to handle 360,000 tons a month at the same time as the Nchanga Orebody is being developed by opencast methods. Stripping of the overburden of the Chingola orebody, a comparatively small shallow deposit of high-grade copper, has also commenced and the operation should be completed by the end of this year. When ore is available from these two sources, together with that from the existing Nchanga West Orebody, it should then be possible to supply the ore treatment plant with the grade and composition of ore most suitable to achieve optimum economic results. It should also enable the output of copper to expand, should market conditions make this desirable.

The present low price of copper, Sir Ernest says, is lower than the overall conditions warrant. He believes that while at the moment supplies of the metal are in excess of demand, there are good reasons to expect that the demand for copper will once again expand and restore more stable conditions in the markets for the metal. This view is, however, qualified by the proviso that there be no industrial setback in America and Europe during the current year.

The steep decline in the world price of copper caused a corresponding fall in Nchanga's profits, net earnings at £9,528,798 being some £7,566,000 lower than in the preceding year. Although Nchanga's position remains sound and its prospects undimmed the contraction in earnings has riveted attention on the need for reducing operating costs. Contrary to general expectations that the impact on the company's earning capacity would be well cushioned by the lower royalties payable, and the smaller bonus, total operating costs were reduced by only £340,000. Since copper royalties and the copper bonus are both geared to the price of copper and formed approximately one-third of the total operating costs during the past year it is obvious that certain working costs must have risen sharply. One such charge was the increase in the cost of marketing metal which rose nearly £500,000 chiefly as the result of higher freight rates levied by the Rhodesian railways.

On financial policy Sir Ernest states that it is proposed to find further large sums from profits over several years and not necessarily in the year in which the money is spent. The extent to which this policy can be implemented will depend on the profits available in any one year, and upon the cash position of the com-

pany. But it will enable the full effects of this large capital expenditure programme to be cushioned *vis-à-vis* future dividend distributions resulting from lower copper prices should these persist.

While it is extremely difficult to be precise about either costs or revenue per ton it would appear that the average selling price throughout the year was approximately £250 per ton with costs around £150 per ton. Thus, even at the present cash price of approximately £210 per ton, the company is able to enjoy a comfortable margin of profit. This is not to say that the falling price of copper can be viewed with indifference but that the copper quotations can fall a good many more points before the profit and loss account will be too weak to give shareholders a run for their money.

CONSOLIDATED TIN SMELTERS AND BOLIVIA

Consolidated Tin Smelters at their current price of 33s. 6d. on the basis of latest full year's distribution of 3s. 6d. per £1 share, offer a yield of about 10.6 per cent. This is covered more than two

and a half times by group earnings but the question ought to be asked whether this is enough in view of the company's substantial dependence on revenue from Bolivia. Earnings from that country come via its subsidiary, Williams, Harvey and Co., which is the largest buyer of Bolivian concentrates.

The Bolivian mining industry is clearly in a mess and latest reports from La Paz indicate that a serious crisis is in prospect. This crisis is long overdue for despite various remedies proposed to halt the serious deterioration in the mining industry which is, after all, the mainstay of the country's economy, not much has been done to try and put the industry on a sound footing. After a three-day conference at the end of last month of Bolivia's nationalized mining industry, practically the same proposals recommended by a firm of American consultants—Ford, Bacon and Davis and published in November, 1956—have been made with the additional recommendation for the injection into the industry of \$8,000,000. This would be earmarked for machinery, intensified research on ore beneficiation, on surveying new deposits

LONDON MARKET HIGHLIGHTS

South African Gold shares tended to ease in quiet trading during the week ended August 7. It was hardly to be expected that there would be a great deal of interest in a period covering the August Bank Holiday and the end of a three-week Account, but there were hopes that the appearance of the highly satisfactory batch of July returns would give the market a fillip. In the event, however, no real demand resulted. Indeed, Buffels actually eased slightly despite the sharp advance in earnings arising mainly from its high initial uranium profit. Similarly, West Driefontein (90s. 7½d.) and Doornfontein (20s. 6d.) gained little benefit.

Towards the latter part of the period, Harmony (25s. 3d.) came into prominence on hopes of good development results in the No. 2 shaft area. Cape buyers lifted New Pioneer to a four-year peak of 24s. 9d. and were also active in St. Helena (27s. 3d.). Riebeeck continued a good market, rising to 12s. 6d. on expectations of good values in the northern corner of the property. Among Finance Houses, Central Mining have risen further to 63s. 1½d. in the light of their strong asset position shown in the recent report. Otherwise, Afrikander Props. have moved erratically; the lack of news concerning a rumoured new acquisition tempted bear operators in the Cape and the shares quickly tumbled to 5s. before rallying to 6s. and are now around 5s. 6d.

Platinums have continued to reflect the lower price quoted by Baker Platinum for the metal, and more particularly the

bearish comments on the outlook for platinum made by Mr. C. W. Engelhard, chairman of the Baker group's parent company. Despite some reassuring comments on the situation, Potgietersrust have fallen from 14s. 6d. to 12s. 9d. and other losses have been sustained by Lydenburg (12s. 3d.) and Waterval (20s. 7½d.). Diamonds have tended to ease in sympathy with dullness on Wall Street.

Copper share prices have sagged with the uninspiring metal quotation now at a four-year low. Rhokana have come back to 34½, Bancroft to 34s. 10½d., and Rhodesia-Katanga to 30s. 6d. Helped by the satisfactory quarterly report, Magundi have been steady at 7s. Rhodesian Land shares quietened after their earlier burst of activity, but a quiet demand has been noted for Rhodesian Corporation at 4s. 7½d. on their undervalued asset position.

Tins have been fully steady, reflecting a confident outlook for the metal price. Among West African Golds, Konongo 1s. 10½d. have improved further on the investment prospects suggested by the surprise interim dividend. In Australian Golds, a sharp fall of 2s. to 10s. in Mount Morgan caused some surprise. The reason appeared later in the shape of a cable from Australia announcing that the company was negotiating for the development of its pyrites deposits and work for the year ended June 30 would show only a "fair" profit. Lead-Zincs have shown little alteration apart from some profit-taking in Consolidated Zinc (74s. 3d.) following the news of Imperial Smelting's new zinc-smelting process.

and for other less important items.

Presumably, the request by the conference for the government to provide \$8,000,000 is aimed at the United States Treasury. But since the U.S. has recently been contributing to Bolivia as much as, or more than the Bolivians, a loan of this order must be considered a somewhat remote possibility unless drastic measures are taken to reorientate the whole of the country's mining industry.

The expropriation of a large chunk of the mining industry a few years ago under the guise of nationalization, automatically flashed the red light for investors, yet Consolidated Tin Smelters, in concert with other British companies having an interest in the Bolivian tin industry, have arranged to finance Bolivia's initial contribution to the Buffer Stock amounting to nearly £2,250,000. The loan is secured, however, by regular deductions from the proceeds of tin concentrates shipped to Williams, Harvey and Co.

Whilst underwriting Bolivia's initial contribution to the Buffer Stock is no more than the company investing in itself, the transaction has doubtless been responsible for the reduction in cash from £437,415 to £125,949 and the appearance of a bank overdraft amounting to £629,479. Taking into account that of the total current assets amounting to £8,365,400 at the end of March last, £4,139,000 was locked up in stocks as valued by officials of the Group and £3,081,000 was accounted for by trade debtors and advances on concentrates, the company has not much in the way of liquid assets. Fortunately, there does not appear to be any need for an immediate outlay of capital.

Although the company's current rate of dividend is well covered, one conclusion must be that either the yield on Malayan tin companies is far too high or that on Consolidated Tin Smelters' is too low.

KENT PASSES DIVIDEND

Kent F.M.S. treated less ground last year than in 1955 and as the yield per cu. yd. was lower and working costs higher, the better price received per ton tin ore, £453 per ton against £426 per ton, did not quite offset these adverse features and mining revenue was slightly lower at £135,254 against £138,317. Higher costs and other outgoings ate into the available revenue and with net earnings down to a mere £2,553 against £15,855 the dividend was passed.

The outlook for the current year is only fair as at the end of the first six months output at 121 tons is only 19 tons higher than the corresponding period of the year under review, which itself represented a sharp fall from the 359 tons produced in 1954.

Consolidated Tin Smelters.—Consolidated Tin Smelters in the year to March 31, 1957, report group trading profits of £1,207,302 against £1,224,699. After all charges, including tax, the net profit for the year was £577,632 compared with £549,819. The distribution was raised from 3s. to 3s. 6d. per £1 stock unit by the addition of a 6d. bonus which, the chairman states, should not be taken to imply a similar distribution next year. The forward balance at fiscal year-end totalled £227,545 against £220,008 brought in. Mr. Clifford Waite is chairman and joint managing director. Meeting, London, August 27.

NCHANGA CONSOLIDATED COPPER MINES LIMITED

(Incorporated in Northern Rhodesia)

FAVOURABLE OUTLOOK IN SPITE OF REDUCTION IN PROFITS

The twentieth annual general meeting of Nchanga Consolidated Copper Mines Limited will be held on August 29 in Salisbury, Southern Rhodesia.

The following are extracts from the statement by the chairman, **Sir Ernest Oppenheimer**, which has been circulated with the annual report and accounts:

The company's year which ended on March 31, 1957, has been one of considerable activity. There has been a most satisfactory increase in the productive potential of the mine and in the ore reserves, and the technical progress made has been impressive.

The expansion of the ore-treatment plant to handle 360,000 tons per month is being carried out simultaneously with measures to open up a very large ore deposit known as the Nchanga orebody by open-cast methods. Stripping the overburden to expose the orebody has been satisfactorily accomplished and ore from this deposit, which is of lower grade than the underground Nchanga West orebody, will soon be fed to the enlarged metallurgical plant.

Second Open Pit

During the year the consulting engineers recommended that the Chingola orebody, a comparatively small shallow deposit of high-grade copper, should be exploited. Stripping of the overburden covering this deposit should be completed by the end of 1957 and ore from this second open pit is expected to be available for treatment early in the new year.

The immediate purpose of these developments is not to increase the output of copper—although this will now be possible should market conditions alter in such a way as to make this desirable at any time in the future—but rather to allow a more flexible production policy than has hitherto been possible.

With three sources of ore to draw from, it will be possible to supply ore to the plant on a more balanced basis and to adjust the grade and composition to suit metallurgical requirements and thus achieve the most economical production of copper.

The total ore reserves at the end of the year in the two open-cast orebodies and the Nchanga West orebody are estimated at 164 million tons, which under present circumstances indicate a mining life of nearly forty years. These estimated reserves are likely to be increased as further exploration and development work is completed.

I am pleased that during the past few years of exceptional prosperity much of the capital required for opening up the Nchanga orebody and for expanding the plant has already been provided from profits. Further large sums will still be needed to complete this and other capital

expenditure programmes and, although most of the money will have to be spent in the immediate future, we propose to meet these commitments by appropriations from profits over several years and not necessarily in the year in which the money is spent. The extent to which this can be carried out will depend on the profits available in any one year and upon the cash position of the Company, but this policy would enable us to cushion the effects on future dividend distributions of lower copper prices, should these persist.

It is also proposed to use the general reserve of £3,500,000, which we created by appropriations from profits last year, to meet the major portion of the Company's remaining commitment to provide about £5,000,000 of loans to the Federal Treasury over the next four years. These loans are being made to assist in the financing of the Kariba hydro-electric scheme, railways, and other essential development projects in the Federation.

Price of Copper

The price of copper, which so materially affects the level of profits of our Company, has fluctuated within wide limits with a progressive movement downwards during the year. The London Metal Exchange price fell from £375 a ton in April, 1956, to £240 a ton at the end of the Company's year, March, 1957, and at the end of June stood at £218 a ton.

Last year I expressed a view that the very high prices obtained for copper in the early months of 1956 could not be expected to recur and that the price would in due course settle down at a lower level. Although there has developed an excess in supplies over the immediate demand for copper, it does seem that the price has fallen lower than the overall market conditions warrant. Provided there are no industrial setbacks in America and Europe during the current year, there are good reasons to expect that the demand for copper will once again expand and restore more stable conditions in the markets for the metal.

The marked decline in the world price of copper caused a corresponding fall in the Company's profits. The net profit at £9,528,798 is some £7,566,000 lower than in the previous year. Nevertheless, our Company's position remains very sound and its prospects continue to be favourable, even though profits may not again reach the levels to which they had been raised through the high price of copper in the previous year.

The report and accounts have been posted to all stockholders. Other persons who are interested may obtain copies from the Head Office of the Company, P.O. Box 1108, Salisbury, Southern Rhodesia, or from the Transfer Offices at 44 Main Street, Johannesburg, or from 40 Holborn Viaduct, London, E.C.1.

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CONSOLIDATED TIN SMELTERS

PROFITABLE OPERATIONS

The annual general meeting of Consolidated Tin Smelters, Ltd., will be held on August 27 in London.

The following is an extract from the circulated statement of the chairman, Mr. Clifford Waite:—

I am happy again to report profitable operations during the year ended March 31, 1957, and I trust the members will regard the report and accounts as satisfactory.

Taking a long term view, it seems we can be reasonably optimistic about the future demand for tin. Since March, tin prices have remained unusually steady at around £760 per ton.

I venture to suggest that but for the existence of the International Tin Agreement the price fall for tin would have been much more marked notwithstanding the narrowness of the margin between supply and demand. I see no reason to alter the opinion expressed in my statement last year, that "This Agreement should achieve the desired objective of reasonable price stability and ordered absorption of the world surplus of tin when the Texas City Smelter ceases its operations".

Your directors are pleased to record a slight advance in the Group trading profits at £1,224,699. Although the aggregate tonnage of concentrates treated in the Works of our operating subsidiaries exceeded that of the previous year, any benefit received from this higher throughput has been heavily offset by the increased costs and charges we have been called upon to bear during the year under review.

Your directors have decided not to appropriate any amount to General Reserve particularly as one of the subsidiary companies has appropriated an amount of £150,000 to a Stock Reserve. The General Reserve, therefore, stands at £1,000,000, the same as last year. An amount of £75,000 has, however, been appropriated to write down the value of shares in Subsidiary companies which, together with the transfer of £75,000 from the amount provided in the past from diminution in value of trade investments, makes a total of £150,000 applied to write down the value of shares in Subsidiary companies. This appropriation, together with the transfer, also reduces the Goodwill item from £400,000 to £250,000.

Your directors are pleased to recommend for your approval, a dividend of 3s. per £1 Ordinary Stock together with a bonus dividend of 6d. per £1 Ordinary Stock, both less tax. These dividends, together with the Preference dividend, will absorb a total net amount of £251,790, and after bringing in an amount of £220,008 from last year the balance to be carried forward by the Holding Company to the next accounts is increased to £227,545.

The recommendation to pay a bonus dividend of 6d. less tax this year should not be taken to imply that a similar distribution will be made next year. Whilst I would hesitate to attempt to forecast the future, I think that it is only prudent to point out that with ever-increasing costs of labour and materials, some of which cannot be absorbed in our contracts, the current year may not yield quite such good results as the year under review.

North British Rubber's £3,000,000 Programme

Since 1946 the North British Rubber Co. has been associated with the United States Rubber Co., and some 12 months ago it was revealed that the latter company had acquired a controlling interest in the Scottish undertaking.

A £3,000,000 modernization plan is being implemented in Edinburgh, where machinery is being installed to produce the latest developments in rubber and plastics. As a result of its association with one of the leading U.S. suppliers of mechanical rubber products, North British Rubber has access to the latest technical developments in this field. Moreover, United States Rubber has recently spent £2,500,000 on a new research laboratory, which the Scottish company can draw upon for guidance. The £3,000,000 programme will take full advantage of these facilities, with the result that the new factory at Edinburgh, when completed, will be among the most modern of its kind in Europe and equal in efficiency to any U.S. factory of comparable size.

ern of its kind in Europe and equal in efficiency to any U.S. factory of comparable size.

North British Rubber were pioneers in belting in the United Kingdom, their first patent dating back to 1859, and they continue to enjoy a high reputation among all user industries. They are now making "Norflam" P.V.C. belting, which complies with the very rigid and comprehensive N.C.B. regulations. Of potential interest to the mining industry is a new product being developed under the name of "Powergrip", which is a toothed timing belt providing a positive and frictionless drive.

An Industrial Products Division has been set up to deal specifically with conveyor belting (rubber and P.V.C.), hose and Powergrip timing belts. Mr. H. H. Helby has been appointed general sales manager of this new division.

Rand & Orange Free State Returns for July

Company	Tons (000)	July 1957			Year ends	Current Financial Year Total to date			Last Financial Year Total to date		
		Yield (oz.)	Profit (£000)			Tons (000)	Yield (oz.)	Profit (£000)	Tons (000)	Yield (oz.)	Profit (£000)
Goldfields											
Doornfontein a	85	34,735	181.2	J		85	34,735	181.2	70	27,650	118.1
Libanon	102	22,850	53.2	D		102	22,850	53.2	99	21,787	54.2
Luipaards Vlei b . . .	73	12,904	115.7	J		73	12,904	115.7	85	15,136	11.6
Rietfontein	24	5,695	16.5	D		171	39,607	113.1	182	41,178	126.8
Robinson	78	16,088	10.6	D		525	106,856	61.7	548	111,798	15.2
Simmer & Jack	98	18,159	19.6	D		669	123,689	129.3	712	123,875	111.4
Sub Nigel	66	16,795	26.8	J		66	16,795	26.8	66	19,950	64.5
Venterspost	127	30,219	63.6	J		127	30,219	63.6	127	29,655	72.6
Vlakfontein	51	18,110	86.7	D		347	124,045	596.7	296	107,279	530.2
Vogels a	98	22,541	104.1	D		691	160,484	502.5	703	176,739	625.7
West Drie a	75	71,765	635.3	J		75	71,765	635.3	75	69,376	566.9
Anglo American											
Brakpan	109	18,569	15.2	D		745	127,161	82.5	747	127,176	89.2
Daggas a	237	51,384	283.0	D		1,597	351,160	1922.2	1,526	346,311	1959.0
East Daggas	95	15,742	35.3	D		665	109,865	241.7	669	110,085	247.9
F.S. Geduld c	62	42,625	291.2	S		520	567,477	1,629.4	263	95,244	270.5
Lorraine a	65	12,949	15.4	D		626	121,628	1,637.7	451	77,239	1,240.6
President Brand a . . .	68	51,457	422.2	S		625	476,757	3914.7	534	421,554	3,468.6
President Steyn a . . .	96	35,739	199.0	D		906	348,763	1983.8	861	320,109	1,822.3
S.A. Lands	93	18,745	60.5	D		630	135,002	458.4	623	127,422	406.7
Spring	126	13,860	6.7	D		885	96,114	40.7	881	107,386	76.1
Vaal Reefs a d	65	29,133	175.8	D		414	181,248	1070.1	141	48,784	207.7
Welkom	83	23,234	56.5	S		859	175,349	491.9	840	183,013	298.0
Western Holdings . . .	103	51,650	380.4	S		939	436,457	2917.7	764	302,483	1,816.2
West Reef Ex. a . . .	123	26,924	66.7	D		856	185,381	449.8	834	267,048	323.1
Central Mining											
Blyvoor a	109	64,421	470.8	J		109	64,421	470.8	112	62,580	476.3
City Deep	156	30,446	15.5	D		1,036	204,790	120.8	1,050	204,116	18.8
Cons. M.R.	168	24,114	10.0	J		168	24,114	10.0	172	23,866	10.4
Crown	238	34,597	5.1	D		1,675	244,678	112.0	2,004	314,375	200.7
D. Roodepoort	185	32,471	51.0	D		1,283	225,021	361.0	1,270	219,014	359.8
East Rand Prop. . . .	225	57,360	146.1	D		1,510	392,586	893.4	1,474	381,701	1,237.6
Harmony a	88	35,214	189.8	J		88	35,214	189.8	78	31,201	173.1
Modder East	145	14,490	4.0	J		145	14,490	4.0	140	14,193	8.5
Rose Deep	50	7,468	0.8	D		347	52,979	2.5	309	50,087	8.0
J.C.I.*											
E. Champ d'Or a . . .	13	353	L28.4	D		85	2,374	L185.7	101	6,744	L257.8
Freddies Cons. a . . .	62	16,914	L7.0	D		402	104,135	L137.2	428	85,003	L283.8
Govt. G.M.A. a . . .	60	11,939	1.2	D		776	130,240	L64.9	1,699	209,337	28.3
Randfontein b	66	10,493	0.6	D		527	88,033	75.9	—	—	—
Union											
East Geduld	145	44,234	314.3	D		969	297,819	2098.5	1,003	309,942	2,203.8
Geduld Prop.	98	15,575	25.0	D		711	112,709	181.8	735	111,399	233.9
Grootvlei	200	42,802	226.4	D		1,357	290,329	1524.2	1,359	293,111	1,592.0
Marievale	74	19,353	87.5	D		497	130,519	585.5	495	129,895	598.0
St. Helena	120	34,802	194.1	D		812	236,714	1303.9	721	211,908	1,140.6
Van Dyk	80	14,109	16.0	D		543	92,299	49.7	561	91,149	10.4
General Mining											
Buffels a e	110	36,290	175.8	J		110	36,290	175.8	—	—	—
Ellaton a	33	7,218	25.0	D		228	48,765	115.5	223	52,329	212.5
S. Roodepoort	30	7,070	25.7	J		30	7,070	25.7	28	6,385	23.2
Stifffontein a	106	49,290	327.1	D		686	301,246	1908.6	618	242,887	1,431.7
W. Rand Cons. b . . .	143	20,504	22.5	D		1,006	146,301	121.7	—	—	—
Anglo-Transvaal											
Hartebeestfontein a .	86	47,300	322.4	J		86	47,300	322.4	66	31,845	183.3
N. Klerkadorp a . . .	11	1,168	L7.7	D		73	8,646	L39.1	75	8,625	L0.8
Rand Leases	174	27,666	12.5	J		174	27,666	12.5	191	30,274	40.3
Village M.R.	34	5,644	7.4	J		34	5,644	7.4	34	5,089	9.7
Virginia O.F.S. a . . .	101	26,922	71.1	J		101	26,922	71.1	65	13,975	22.0
Others											
N. Kleinfontein	103	12,324	0.5	D		690	80,255	L46.6	739	86,815	16.0
Wit Nigel	18	4,303	7.9	J		18	4,303	7.9	18	3,975	8.4

Gold has been valued at 250/4d. (June 250/2d.) per oz. fine. L indicates loss. †Working Profit. *Working Profit includes sundry revenue. a Excluding revenue from Uranium, Acid and Pyrite. b Gold Division only. c Production began January 1956. d Production began May 1956. e Production began January 1957. Operations at Merriespruit remain suspended.

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